

IN THE CLAIMS:

Please revise the set of pending claims as set forth herein.

1. (Currently Amended) A method for communicating information on a carrier frequency via a communication channel connecting a transmitter on a transmitting side and a receiver on a receiving side, involving frequency modulation with a modulation index M that is not greater than 0.2 to thus compress a bandwidth of an information signal to have a small or very small frequency deviation and two significant sidebands at the output of the modulator of the transmitter ~~at the transmitting side of the communication channel and in the communication channel~~, the method comprising:

frequency modulating an information signal with a modulation index M that is not greater than 0.2 to compress a bandwidth of the information signal to form a narrow band or very narrow band frequency-modulated information signal having a small or very small carrier frequency deviation at the transmitting side of a narrow or very narrow band communication channel and in said communication channel;

suppressing upper and lower significant sidebands of the narrow band or very narrow band frequency-modulated information signal;

transmitting, via the communication channel, said narrow band or very narrow band frequency-modulated information signal ~~with the suppressed~~ without the upper and lower significant sidebands such that the transmitted information signal obtains a total power of said transmitter and includes only the instantaneous frequency varied about the carrier frequency;

receiving the narrow band or very narrow band frequency-modulated information signal ~~with the suppressed~~ without any upper and lower significant sidebands from the communication channel at the receiving side of the communication channel; and

expanding the frequency deviation of the received narrow band or very narrow band frequency-modulated information signal, without any ~~with the suppressed~~ upper and lower significant sidebands at the receiving side and outside ~~without expanding a bandwidth~~ of said communication channel so as to form an expanded-wideband-frequency deviation information signal, the step of expanding for improving a signal-to-noise ratio and performed such that a bandwidth of said narrow band or very narrow band communication channel is never expanded.

2. (Currently Amended) The method as set forth in claim 1, further comprising:
converting the expanded-wideband-frequency-deviation information signal to a low frequency signal or audio signal.

3. (Currently Amended) The method as set forth in claim 1, further comprising:
further processing the expanded-wideband-frequency-deviation frequency modulated information signal.

4. (Currently Amended) The method as set forth in claim 1, further comprising:

converting the narrowband or very narrowband frequency-modulated information signal ~~with suppressed~~ without upper and lower significant sidebands received from the communication channel to ~~an a narrowband~~ intermediate frequency (IF) information signal without upper and lower significant sidebands before expanding its frequency deviation.

5. (Currently Amended) The method as set forth in claim 4, further comprising:
passing the narrowband IF information signal without upper and lower significant sidebands through a half wave rectifier and schmitt trigger; and
cleaning an information signal output by the schmitt trigger with a wave shaping circuit.

6. (Currently Amended) The method as set forth in claim 1, wherein the expanding step includes:
expanding the frequency deviation of the received narrowband or very narrowband frequency-modulated information signal ~~with the suppressed~~ without upper and lower significant sidebands by frequency multiplication.

7. (Currently Amended) The method as set forth in claim 1, wherein the expanding step includes:

expanding the frequency deviation of the received narrowband or very narrowband frequency-modulated information signal ~~with~~ without the ~~suppressed~~ upper and lower significant sidebands by a ~~phase-lock loop (PLL)~~ frequency multiplier.

8. (Currently Amended) The method as set forth in claim 1, further comprising:
removing noise from the narrowband or very narrowband frequency-modulated information signal without ~~with~~ the ~~suppressed~~ upper and lower significant sidebands received from the communication channel before converting said narrowband or very narrowband frequency-modulated information signal without ~~with~~ the ~~suppressed~~ upper and lower significant sidebands to a low frequency signal or audio signal.

9. (Currently Amended) The method as set forth in claim 1, further comprising after the step of expanding, the step of demodulating the expanded-wideband-frequency-deviation information signal to output an audio signal having sound quality comparable to sound recorded on CD-ROM.

10. (Currently Amended) A receiver for receiving and processing narrow band or very narrow band frequency-modulated information signals ~~with-suppressed~~ without upper and lower sidebands that have a predetermined small or very small frequency deviation due to compression of

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transmitted signals, and that have been transmitted over a narrow band or very narrow band communication channel, the receiver comprising:

means for receiving from the communication channel the narrow band or very narrow band frequency-modulated information signals without ~~with~~ the ~~suppressed~~ upper and lower sidebands, said narrow band or very narrow band frequency-modulated information signals without ~~with~~ the ~~suppressed~~ upper and lower sidebands having the predetermined small or very small frequency deviation; and

a circuit that expands the predetermined small or very small predetermined frequency deviation of the received narrow band or very narrow band frequency-modulated information signals without ~~with~~ the ~~suppressed~~ upper and lower sidebands to form an expanded wideband frequency deviation information signal, said frequency deviation expanding circuit including a phase lock loop circuit having a frequency divider with a dividing ratio that corresponds to a selected expansion of the frequency deviation, an output signal of the phase lock loop circuit being down-converted to a second wideband intermediate frequency information signal.[[.]]

11. (Canceled).

12. (Canceled).

13. (Original) The receiver according to claim 10, wherein the frequency deviation expanding circuit includes:

a circuit having frequency-multiplying characteristics; and

a filter, connected to an output of the circuit having frequency-multiplying characteristics, the filter passing a multiplied-frequency signal component.

14. (Original) The receiver according to claim 10, further comprising:

means for removing noise from information signals from the receiving means before said signals from said receiving means are converted to a low frequency signal or audio signal.

15. (Currently Amended) A transmitter for transmitting an information signal via a communication channel connecting a transmitting side and a receiving side, involving frequency modulation with a modulation index M that is not greater than 0.2 to thus compress a bandwidth of the information signal to have a small or very small frequency deviation at the transmitting side of the communication channel and in the communication channel, the transmitter comprising:

means for frequency modulating an information signal with a modulation index M that is not greater than 0.2 to compress a bandwidth of the information signal to form a narrow band or very narrow band frequency-modulated information signal having a small or very small frequency deviation at the transmitting side of a narrow or very narrow band communication channel and in said communication channel; and

means for suppressing upper and lower significant sidebands of the narrow band or very narrow band frequency-modulated information signal prior to transmission; and transmitting, via the communication channel, said narrow band or very narrow band frequency-modulated information signal without the upper and lower significant sidebands such that the transmitted information signal obtains a total power of said transmitter and includes only the instantaneous frequency varied about the carrier frequency.

16. (Original) The transmitter according to claim 15, wherein said means for suppressing includes a bandpass filter.

17. (Currently Amended) A method for communicating information via a communication channel connecting a transmitter on a transmitting side and a receiver on a receiving side, involving phase modulation with a modulation index M that is not greater than 0.2 to thus compress a bandwidth of an information signal to have a small or very small frequency deviation and two significant sidebands at the output of the modulator of the transmitter at the transmitting side of the communication channel and in the communication channel, the method comprising:

phase modulating an information signal with a modulation index M that is not greater than 0.2 to compress a bandwidth of the information signal to form a narrow band or very narrow band phase-modulated information signal having a small or very small carrier frequency deviation

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at the transmitting side of a narrow or very narrow band communication channel and in said communication channel;

suppressing upper and lower significant sidebands of the narrow band or very narrow band phase-modulated information signal;

transmitting, via the communication channel, said narrow band or very narrow band phase-modulated information signal, the instantaneous frequency varied about the carrier frequency only, with the suppressed without the upper and lower significant sidebands such that the transmitted information signal obtains a total power of said transmitter;

receiving the narrow band or very narrow band phase-modulated information signal ~~with the suppressed~~ without any upper and lower significant sidebands from the communication channel at the receiving side of the communication channel; and

expanding the frequency deviation of the received narrow band or very narrow band phase-modulated information signal, without any ~~with the suppressed~~ upper and lower significant sidebands at the receiving side and outside ~~without expanding a bandwidth~~ of said communication channel so as to form an expanded-wideband-frequency deviation information signal, the step of expanding for improving a signal-to-noise ratio and performed such that a bandwidth of said narrow band or very narrow band communication channel is never expanded.

18. (Currently Amended) The method as set forth in claim 17, further comprising:

converting the expanded-wideband-frequency-deviation information signal to a low frequency signal or audio signal.

19. (Currently Amended) The method as set forth in claim 17, further comprising:
further processing the expanded-wideband-frequency-deviation phase modulated information signal.

20. (Currently Amended) The method as set forth in claim 17, further comprising:
converting the narrowband or very narrowband phase-modulated information signal ~~with suppressed~~ without upper and lower significant sidebands received from the communication channel to ~~an~~ a narrowband intermediate frequency (IF) information signal without upper and lower significant sidebands before expanding its frequency deviation.

21. (Currently Amended) The method as set forth in claim 20, further comprising:
passing the narrowband IF information signal without upper and lower significant sidebands through a half wave rectifier and schmitt trigger; and
cleaning an information signal output by the schmitt trigger with a wave shaping circuit.

22. (Currently Amended) The method as set forth in claim 17, wherein the expanding step includes:

expanding the frequency deviation of the received narrowband or very narrowband phase-modulated information signal ~~with the suppressed~~ without upper and lower significant sidebands by frequency multiplication.

23. (Currently Amended) The method as set forth in claim 17, wherein the expanding step includes:

expanding the frequency deviation of the received narrowband or very narrowband phase-modulated information signal ~~with~~ without the ~~suppressed~~ upper and lower significant sidebands by a phase-lock loop (PLL) frequency multiplier.

24. (Currently Amended) The method as set forth in claim 17, further comprising:
removing noise from the narrowband or very narrowband phase-modulated information signal without ~~with~~ the ~~suppressed~~ upper and lower significant sidebands received from the communication channel before converting said narrowband or very narrowband phase-modulated information signal without ~~with~~ the ~~suppressed~~ upper and lower significant sidebands to a low frequency signal or audio signal.

25. (Currently Amended) The method as set forth in claim 17, further comprising after the step of expanding, the step of demodulating the expanded-wideband-frequency-deviation information signal to output an audio signal having sound quality comparable to sound recorded on CD-ROM.

26. (Currently Amended) A receiver for receiving and processing narrow band or very narrow band phase-modulated information signals ~~with suppressed~~ without upper and lower sidebands that have a predetermined small or very small frequency deviation due to compression of transmitted signals, and that have been transmitted over a narrow band or very narrow band communication channel, the receiver comprising:

means for receiving from the communication channel the narrow band or very narrow band phase-modulated information signals without ~~with the suppressed~~ upper and lower sidebands, said narrow band or very narrow band phase-modulated information signals without ~~with the suppressed~~ upper and lower sidebands having the predetermined small or very small frequency deviation; and

a circuit that expands the predetermined small or very small predetermined frequency deviation of the received narrow band or very narrow band phase-modulated information signals without ~~with the suppressed~~ upper and lower sidebands to form an expanded wideband frequency deviation information signal, said frequency deviation expanding circuit including a phase lock loop circuit having a frequency divider with a dividing ratio that

corresponds to a selected expansion of the frequency deviation, an output signal of the phase lock loop circuit being down-converted to a second wideband or very wideband intermediate frequency information signal. [[.]]

27. (Canceled).

28. (Canceled).

29. (Original) The receiver according to claim 26, wherein the frequency deviation expanding circuit includes:

a circuit having frequency-multiplying characteristics; and

a filter, connected to an output of the circuit having frequency-multiplying characteristics, the filter passing a multiplied-frequency signal component.

30. (Original) The receiver according to claim 26, further comprising:

means for removing noise from information signals from the receiving means before said signals from said receiving means are converted to a low frequency signal or audio signal.

31. (Currently Amended) A transmitter for transmitting an information signal via a communication channel connecting a transmitting side and a receiving side, involving phase

modulation with a modulation index M that is not greater than 0.2 to thus compress a bandwidth of the information signal to have a small or very small frequency deviation at the transmitting side of the communication channel and in the communication channel, the transmitter comprising:

means for phase modulating an information signal with a modulation index M that is not greater than 0.2 to compress a bandwidth of the information signal to form a narrow band or very narrow band frequency-modulated information signal having a small or very small frequency deviation at the transmitting side of a narrow or very narrow band communication channel and in said communication channel; and

means for suppressing upper and lower significant sidebands of the narrow band or very narrow band phase-modulated information signal prior to transmission;

transmitting, via the communication channel, said narrow band or very narrow band phase-modulated information signal without the upper and lower significant sidebands such that the transmitted information signal obtains a total power of said transmitter and includes only the instantaneous frequency varied about the carrier frequency.

32. (Original) The transmitter according to claim 31, wherein said means for suppressing includes a bandpass filter.

33. (New) The method according to claim 1, wherein said method steps are applied within a wired digital and/or analog telecommunication system.

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34. (New) The method according to claim 1, wherein said method steps are applied within a wireless digital and/or analog telecommunication system.

35. (New) The method according to claim 17, wherein said method steps are applied within a wired digital and/or analog telecommunication system.

36. (New) The method according to claim 17, wherein said method steps are applied within a wireless digital and/or analog telecommunication system.